

## 1 Claims

## 3 1. Optical module having

- 4 - a circuit carrier (10);
- 5 - a housed semiconductor element (12) arranged on the
- 6 circuit carrier (10); and
- 7 - a lens unit (14; 16, 18, 20; 21) for projecting
- 8 electromagnetic radiation onto the semiconductor
- 9 element (12);

10 characterized in that

- 11 - the lens unit comprises an area (14), supporting the
- 12 lenses (16, 18, 20; 21), that is an integral
- 13 component of the housing (13) of the semiconductor
- 14 element (12).

## 16 2. Optical module according to claim 1,

17 characterized in that

18 the area (14) supporting the lenses (16, 18, 20; 21) is  
19 preferably formed in one piece with the housing (13),  
20 preferably from a thermosetting plastic material.

## 22 3. Optical module according to claim 1,

23 characterized in that

24 the area (14) supporting the lenses (16, 18, 20; 21) is  
25 preferably formed on the housing (13), for instance in a  
26 two-component injection process.

## 28 4. Optical module according to claim 3,

29 characterized in that

30 the area (14) supporting the lenses (16, 18, 20; 21)  
31 contains thermoplastic material and the housing (13)  
32 contains thermosetting material.

- 1 5. Optical module according to one of the preceding claims,  
2 characterized in that  
3 the lens unit (14; 16, 18, 20; 21) comprises a plurality  
4 of lenses in the form of a package, the lenses (16, 18,  
5 20) and where appropriate at least one diaphragm (21)  
6 being preferably in direct contact with one another, and  
7 the relative positions of the lenses (16, 18, 20) and  
8 where appropriate the diaphragm (21) to one another being  
9 preferably defined by the geometry of the lenses and/or  
10 diaphragm themselves.  
11
- 12 6. Optical module according to one of the claims 1 to 5,  
13 characterized in that  
14 just one (20) of the lenses (16, 18, 20; 21) is in direct  
15 contact with the lens holder (14), preferably in a  
16 watertight and dustproof manner, the methods for  
17 attaching the exactly one lens (20) to the lens holder  
18 (14) including preferably ultrasound, laser soldering  
19 and/or adhesives.  
20
- 21 7. Optical module according to one of the claims 1 to 5,  
22 characterized in that  
23 the lenses (16, 18, 20; 21) are snapped into the lens  
24 holder (14) by a means of latching (32), the lenses (16,  
25 18, 20) or diaphragm (21) preferably having a hard and a  
26 soft component for the purpose of forming a watertight  
27 and dustproof seal, with the soft component being  
28 arranged as a seal in the area of the lenses (16, 18, 20;  
29 21).  
30
- 31 8. Optical module according to one of the claims 1 to 5,  
32 characterized in that

1 the lenses (16, 18, 20; 21) are attached in the area (14)  
2 supporting the lenses, within the chip housing (13), by  
3 means of a retaining element, said retaining element  
4 preferably having a hard and a permanently elastic  
5 component formed on the area supporting the lens (20) for  
6 the purpose of forming a seal and compensating for  
7 stress, and said retaining element being joined to its  
8 hard component by ultrasound, laser soldering and/or  
9 adhesive or riveting methods, or by means of a snap or  
10 screw connection to the area (14) supporting the lenses  
11 (16, 18, 20, 21).  
12

13 9. Optical module according to one of the preceding claims,  
14 characterized in that  
15 pigments are applied to the area (14) supporting the  
16 lenses (16, 18, 20; 21), giving rise to a black and/or  
17 dull or totally reflective finish, by which means  
18 unwanted optical effects, in particular those due to the  
19 lateral incidence of light, are prevented.  
20

21 10. Optical system having an optical module according to one  
22 of the preceding claims.  
23